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10/811,410	03/26/2004	Toshihiko Kataoka	JP920030050US1	3276

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EXAMINER

ZAMAN, FAISAL M

ART UNIT	PAPER NUMBER
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2112

DATE MAILED: 09/27/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/811,410	Applicant(s) KATAOKA, TOSHIHIKO	
	Examiner Faisal Zaman	Art Unit 2112	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 July 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-17 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>July 20, 2004</u> . | 6) <input type="checkbox"/> Other: _____ |

PD

DETAILED ACTION

Information Disclosure Statement

1. The references listed on the Information Disclosure Statement submitted on 22 July 2004 have been considered by the examiner (see attached PTO-1449).

Specification

2. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The following title is suggested: --INTERRUPT CONTROL DEVICE WHICH SENDS DATA TO PROCESSOR AT OPTIMIZED TIME--.

In addition, please make the title the same throughout all documents in the application ("Method for Data Protection For Removable Recording Medium" was used as the title in several documents in the application).

3. The disclosure is objected to because of the following informalities:
 - a. In Line 6 of the Background, the Published Unexamined Patent Application No. should be JP10-275136, rather than 10-275136.
 - b. In Line 4 of the third paragraph of the Background, "polling" is misspelled.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

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5. **Claims 1-17** are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

As per Claims 1, 15, 16, and 17, if the interrupt is issued prior to data acquisition, it is not clear how the interrupt indicates the data has become available. The Examiner would interpret this limitation, for examination purposes, to mean the interrupt is sent to the central processing unit before said object acquiring unit receives *all* said data or said resource, indicating that *some* said data or said resource has become available.

As per Claim 7, it is not clear as to what a “predetermined small value” is or how the “predetermined small value” is determined. The Examiner would interpret this limitation, for examination purposes, to mean the setup period change unit changes said setup period to make said average the *smallest possible* value.

As per Claim 8, it is not clear as to what type of “distribution of said time differences” the setup period change unit changes the setup period according to. The Examiner would interpret this limitation, for examination purposes, to mean the setup period change unit changes said setup period according *to an average* of a distribution of said time differences measured by said time difference measuring unit.

As per Claim 9, it is not clear as to what a “predetermined percentage of said time differences” is or how it is determined. In addition, it is not clear as to what the “predetermined value” is or how it is determined. The Examiner would

interpret this limitation, for examination purposes, to mean to have said setup period change unit change said setup period to make the *average* of time differences less than or equal to the *smallest possible* value. The “predetermined percentage of said time differences” would be the said time differences in the average which are below the smallest possible value described in Claim 7.

All claims not specifically addressed are rejected due to a dependency.

Correction/clarification is therefore required.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 15, 16, and 17 are rejected under 35 USC 103(a) as being obvious over Hashimoto et al. (“Hashimoto”) (U.S. 6,397,282) in view of Williams et al. (“Williams”) (U.S. 6,167,480).

Hashimoto discloses the invention substantially as claimed.

Regarding Claim 1, Hashimoto discloses:

An interrupt control device (Fig. 3, item 20, Column 2, lines 23-29) for issuing interrupts to a central processing unit, comprising:

An object acquiring unit (Fig. 3, item 22, Column 11, line 1) for acquiring data or resource(s) for use by said central processing unit;

An interrupt issuing unit for issuing an interrupt to said central processing unit before said object acquiring unit acquires said data or said resource, said interrupt indicating that said data or said resource has become available (Fig. 3, item 26, Column 11, lines 15-19);

Hashimoto does not disclose expressly:

A use delay unit for delaying the use of said data or said resource by said central processing unit until said object acquiring unit acquires said data or said resource if said central processing unit which has received said interrupt requests the use of said data or said resource before said object acquiring unit acquires said data or said resource.

In the same field of endeavor (e.g. providing an interrupt signal to a host system processor), Williams discloses a use delay unit (Column 3, lines 8-21) for delaying the use of said data or said resource by said central processing unit until said object acquiring unit acquires said data or said resource if said central processing unit which has received said interrupt requests the use of said data or said resource before said object acquiring unit acquires said data or said resource.

Accordingly, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to have incorporated Williams' teachings of providing an interrupt signal to a host system processor with the teachings of Hashimoto, for the purpose of providing only a single interrupt for an incoming information packet's reception (see Williams, Column 4, lines 8-10). Also, it would have been desirable as stated by Williams for a network peripheral to be

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able to provide such an interrupt for information packets that conform to a user specified network operating system protocol (see Williams, Column 4, lines 8-26). Hashimoto provides motivation to combine by making a point of his invention to be able to postpone interrupt requests that do not require immediate attention (see Hashimoto, Column 2, lines 10-22).

Regarding Claim 15 all the same elements of Claim 1 are listed, but where the central processing unit and interrupt control device are located in an information processing device. Since it would be obvious to one of ordinary skill in the art that a central processing unit and interrupt control device would be located in some sort of an information processing device, the supporting rationale of the rejection to Claim 1 applies equally as well to Claim 15.

Regarding Claim 16 all the same elements of Claim 1 are listed, but in method form rather than system form. Therefore, the supporting rationale of the rejection to Claim 1 applies equally as well to Claim 16.

Regarding Claim 17 all the same elements of Claim 1 are listed, but in program product form rather than system form. Therefore, the supporting rationale of the rejection to Claim 1 applies equally as well to Claim 17.

Claim Rejections - 35 USC § 103

7. **Claims 2-5, 10, and 12-14** are rejected under 35 U.S.C. 103(a) as being unpatentable over Hashimoto-Williams as applied to claim 1 above, and further in view of Reid et al. ("Reid") (U.S. 6,115,776).

Hashimoto-Williams discloses the invention substantially as claimed.

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Hashimoto-Williams discloses the interrupt control device according to Claim 1 as described above.

Regarding Claim 2, Hashimoto-Williams does not disclose expressly wherein said interrupt issuing unit issues said interrupt after a predetermined setup period elapses from when a data generation device generating said data starts to generate said data.

In the same field of endeavor (e.g. improvements to the transmission of information between digital devices over a communications medium), Reid discloses wherein said interrupt issuing unit (Reid, Column 9, lines 6-15) issues said interrupt after a predetermined setup period elapses from when a data generation device generating said data starts to generate said data.

Accordingly, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have incorporated Reid's teachings of improvements to the transmission of information between digital devices over a communications medium with the teachings of Hashimoto-Williams, for the purpose of reducing "the number of interrupts generated by the network to the processor and to thereby reduce the processing burden to the operating system of servicing those interrupts" (Reid, Column 3, lines 29-31). Hashimoto-Williams provides motivation to combine by stating that interruption requests that do not require immediate attention are postponed from being sent to the central processing unit until a predetermined delay has elapsed (Hashimoto, Column 2, lines 10-22).

Regarding Claim 3, Hashimoto-Williams and Reid disclose the following limitations, which are not disclosed expressly in Hashimoto and Williams:

A time difference measuring unit (Reid, Column 9, lines 6-15) for measuring a time difference between when said object acquiring unit acquires said data and when said central processing unit which has received said interrupt requests the use of said data; and

A setup period change unit (Column 9, lines 27-29) for changing said predetermined setup period according to said time difference.

The motivation that was utilized in the combination of Claim 2, super, applies equally as well to Claim 3.

Regarding Claim 4, Hashimoto and Williams do not disclose expressly:

An acquisition time measuring unit for measuring an acquisition time from when said data generation device starts to generate said data until said object acquiring device acquires said data;

Wherein said setup period change unit changes said setup period according to said acquisition time and said time difference.

In the same field of endeavor, Williams discloses:

An acquisition time measuring unit (Figure 11, item 270, Column 14, lines 14-18) for measuring an acquisition time from when said data generation device starts to generate said data until said object acquiring device acquires said data;

Wherein said setup period change unit changes said setup period according to said acquisition time and said time difference.

Please note the definition of "latency" as used in the reference in this rejection can be found at <Hyperdictionary.com>. The portion of the claim regarding the setup period change unit is rejected because it would be obvious to one of ordinary skill in the art that said acquisition time and the said time difference are directly related, therefore the supporting rationale of the rejection to Claim 3 applies equally as well here.

The motivation that was utilized in the combination of Claim 2, super, applies equally as well to Claim 4.

Regarding Claim 5, Reid discloses the following limitations, which are not disclosed expressly in Hashimoto and Williams:

Said data generation device (Column 3, lines 40-44) generates a plurality of data segments;

Said object acquiring unit (Column 5, lines 3-6) sequentially acquires said plurality of data segments for use by said central processing unit;

Said interrupt issuing unit (Column 9, lines 7-15) issues an interrupt to said central processing unit before said object acquiring unit acquires each of said plurality of data segments, each said interrupt indicating that the respective one of said plurality of data segments has become available;

Said time difference measuring unit (Column 9, lines 6-15) measures, for each of said plurality of data segments, the time difference between when said object acquiring unit acquires said data segment and when said central processing unit which has received said interrupt requests the use of said data segment; and

Said setup period change unit (Column 9, lines 27-29) changes said setup period according to the time differences measured by said time difference measuring unit.

The motivation that was utilized in the combination of Claim 2, super, applies equally as well to Claim 5.

Regarding Claim 10, Hashimoto and Williams do not disclose a setup period change unit for, (i) changing said setup period to a smaller value if said central processing unit which has received said interrupt requests the use of said data or said resource before said object acquiring unit acquires said data or said resource, and (ii) changing said setup period to a greater value if said central processing unit which has received said interrupt requests the use of said data or said resource after said object acquiring unit acquires said data or said resource. However, in the same field of endeavor, Reid discloses a setup period change unit which has a delay that may be user-programmable, or it may be system-programmable based on varying system parameters (Reid, Column 6, lines 36-37). Reid further discloses a setup period change unit that is able to generate an interrupt after a said number of packets accumulates or after a predetermined period of time elapses (Reid, Column 9, lines 13-15).

Accordingly, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to have incorporated Reid's teachings of delaying interrupts until a predetermined number of data packets accumulates or a predetermined period of time elapses to the teachings of Hashimoto-Williams for the purpose of increasing or decreasing the number of data packets that are

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stored in storage (Hashimoto, Column 11, line 1) before an interrupt is sent to the central processing unit.

The motivation that was utilized in the combination of Claim 2, super, applies equally as well to Claim 10.

Regarding Claims 12, 13, and 14, all the same elements of Claims 2, 3, and 4, respectively are listed, but where “data generation device” is replaced with “resource reservation device”. Since “data” and “resource” were used interchangeably in other claims (ie. Claims 1, 10, and 11, and numerous times in the specification), the supporting rationale of the rejection to Claims 2, 3 and 4 apply equally as well to Claims 12, 13, and 14, respectively.

Claim Rejections - 35 USC § 103

8. **Claims 6-9** are rejected under 35 USC 103(a) as being unpatentable over Hashimoto-Williams and Reid as applied to Claims 2-5 above, and in further view of Williams (“Williams ‘305”) (U.S. 6,061,305).

Hashimoto-Williams and Reid disclose the invention substantially as claimed.

Regarding Claim 6, Hashimoto-Williams do not disclose expressly wherein said setup period change unit changes said setup period according to the average of the time differences measured by said time difference measuring unit.

In the same field of endeavor (e.g. providing an interrupt signal to a host processor unit), Hashimoto-Williams and Reid disclose wherein said setup period change unit (Williams, Column 14, lines 19-26) changes said setup period according to the average of the time differences (Williams ‘305, Column 4 line 66 – Column 5, line 27) measured by said time difference measuring unit.

Accordingly, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have incorporated Williams '305's teachings of providing an interrupt signal to a host processor unit along with measuring duration times of each of a series of events and particularly to determining the average event duration time to the teachings of Hashimoto-Williams and Reid, for the purpose of finding a value that will be most useful in optimizing device performance (Williams '305, Column 1, lines 39-40).

Hashimoto-Williams and Reid provide motivation to combine by stating that an interrupt is asserted as an optimum interrupt time (Williams, abstract).

Regarding Claim 7, Williams '305 discloses the following limitation, which is not disclosed expressly in Hashimoto-Williams: wherein said setup period change unit (Williams '305, Column 5, lines 23-27) changes said setup period to make said average a predetermined small value.

The motivation that was utilized in the combination of Claim 6, super, applies equally as well to Claim 7.

Regarding Claims 8 and 9, since they are directly related to Claim 7 (according to the Examiner's interpretation), the supporting rationale of the rejection to Claim 7 applies equally as well to Claims 8 and 9.

Claim Rejections - 35 USC § 103

9. **Claim 11** is rejected under 35 USC 103(a) as being obvious over Hashimoto-Williams in view of Reid and in further view of Brice, Jr. et al. ("Brice") (U.S. 6,754,738).

Hashimoto-Williams discloses the invention substantially as claimed.

Hashimoto-Williams discloses a delay processing unit for (ii) causing said central processing unit to return from interrupt handling caused by said interrupt, to delay the use of said data or said resource by said central processing unit until said object acquiring unit acquires said data or said resource (Hashimoto, Figure 5, Column 8, lines 1-24). However, Hashimoto-Williams do not disclose expressly a delay time calculation unit for calculating a delay time required from the time said object acquiring unit receives a request for use of said data or resource from said central processing unit which has received said interrupt until said object acquiring unit acquires said data or resource as well as a delay processing unit for (i) causing said central processing unit to use polling to request said data or said resource if said delay time is less than a predetermined threshold.

In the same field of endeavor (e.g. improvements to the transmission of information between digital devices over a communications medium), Reid discloses a delay time calculation unit (Column 10, lines 8-18) for calculating a delay time required from the time said object acquiring unit receives a request for use of said data or resource from said central processing unit which has received said interrupt until said object acquiring unit acquires said data or resource.

Accordingly, it would have been obvious to one of ordinary skill in the computer architecture art at the time the invention was made to have incorporated Reid's teachings of a computer operating system in which interrupts are generated to a processor by events which then require processor time to service to the teachings of Hashimoto and Williams, for the purpose of delaying

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data to be sent to the processor until a predetermined amount of data segments or a predetermined time has elapsed (Reid, abstract, Brice, abstract).

Hashimoto-Williams provides motivation to combine by stating that interruption requests that do not require immediate attention are postponed from being sent to the central processing unit a predetermined delay has elapsed (Hashimoto, Column 2, lines 10-22).

In the same field of endeavor, Brice discloses a delay processing unit (Brice, Column 11, lines 28-32) for (i) causing said central processing unit to use polling to request said data or said resource if said delay time is less than a predetermined threshold.

The motivation that was utilized in the combination of the previous part of the claim, super, applies equally as well to this part of the claim.

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Jinzaki (U.S. Publication No. 2004/0236875) discloses a computer for determining interruption delay dynamically. Williams et al. (U.S. 5,881,296) discloses a method for improved interrupt processing in a computer system. Huffman et al. (U.S. 6,640,274) discloses a method and apparatus for reducing the disk drive data transfer interrupt service latency penalty. Paul et al. (U.S. 6,721,878) discloses low-latency interrupt handling during memory access delay periods in microprocessors. Stevens (U.S. 6,338,111) discloses a method and apparatus for reducing I/O interrupts. Kailash et al. (U.S. 6,185,639) discloses a system and method to reduce a computer system's interrupt

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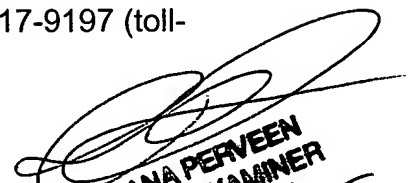
processing overhead. Binford et al. (U.S. 5,671,365) discloses an I/O system for reducing main processor overhead in initiating I/O requests and servicing I/O completion events. Bashford (U.S. 6,629,179) discloses a message signaled interrupt generating device and method. Constantinos Dovrolis, Brad Thayer, and Parameswaran Ramanathan (ACM SIGOPS Operating Systems Review, Volume 35, Issue 4) disclose a method for hybrid interrupt-polling for the network interface.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Faisal Zaman whose telephone number is 571-272-6459. The examiner can normally be reached on Monday thru Friday, 9 am – 5:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rehana Perveen can be reached on 571-272-3676. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

FMZ


REHANA PERVEEN
PRIMARY EXAMINER
9/26/05